Obesity frequency and related risk factors in primary school children

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ABSTRACT

Objectives. The aim of this study was to determine the obesity and overweight situations and related factors among the children between the ages of 6-11 studying in Rize, Turkey. Methods. The study included 180 pediatric patients (86 girls and 94 boys) applying to our policlinic, who born between 2006 and 2010. The age, height, weight and gender of children and their parents, physical activity status of children, frequency of convenience goods consumption, education and income status of parents and duration of children spent on television were evaluated. Body mass indexes of participants were measured and compared with their socio-demographic characteristics. Results. Obesity was found in 12.2% and overweight was found in 15% of all students participating the study. While a relation was found between being obese or overweight with gender, body mass index of parents, staying more than 2 hours a day in front of television, fast-food consumption and low physical activity; no relation could be found between the educational status of parents, time of starting supplementary food during infancy and and the duration of total breastfeeding. Conclusions. The increase in frequency of childhood obesity has been particularly important for identifying risk factors associated with obesity and competing with these factors in the early period. Family physicians, the first contact points of the patients, are the most important part of the health system in preventing childhood obesity. A higher prevalence of childhood obesity than other studies in the literature may indicate that obesity will become an increasingly common problem.

Key Words: Obesity, pediatric, body mass index

Introduction

The World Health Organization (WHO) has characterized obesity as a global epidemic [1]. WHO now estimates that 42 million children under the age of 5 are obese [2]. Obesity is the result of complex interaction of cultural, social, genetic, physiological, behavioral and psychological factors [3]. Childhood obesity is a health problem that should be taken into consideration due to its progression as adult obesity, serious increase of morbidity and mortality, and most importantly, and being mostly preventable [4, 5]. It is known that the onset of obesity in the majority of adults extends to childhood [6, 7].
Both genetic and environmental factors such as inheritance, gender, ethnicity, sedentary lifestyle and low physical activity are responsible for obesity [8-11].

Overweight and obesity in childhood can affect by genetic factors, environmental factors and psychological factors. The overweight or genetic predisposition of parents increases the likelihood that the child is obese [12]. Sedentary lifestyle including watching television, spending long time with computer and mobile phone, lack of time for physical activities and games, and consumption of fast food, sugary and fatty food and beverages play an important role in obesity. In addition, problems of the children with their parents and friends, failures in their lessons and other psychological problems during puberty also affect the development of obesity [13, 14].

With this study, it was aimed to determine the level of excess weight and obesity prevalence in primary school students in Rize city center and to determine some factors that may affect this situation.

Methods

Study Group

The study is an epidemiological study aimed at finding cross-sectional prevalence. A total of 180 pediatric patients at primary school born between 2006 and 2010 were included applying to the Family Medicine policlinic of Recep Tayyip Erdoğan University. The questionnaires given to the study groups were requested to be completed by their parents.

Measurements

Height measurement was made using a measuring tape mounted on wall. The students were made to take their shoes out and their height was measured from the head to the base in a position where the feet were ready to touch each other, back of the head, hip and heels were touching to a flat wall. The weight was removed by removing students’ heavy clothes and feet. Portable bench scale sensitive to 100 grams was used. The weight recorded in kilograms was divided by the square of height (in meters) to calculate body mass index of the students. Body mass index (BMI) values were compared with the reference range of National Center of Health Statistics (NCHS), over the 85th percentile was regarded as overweight and over the 95th percentile was regarded as obesity.

Collecting data

Questionnaires were filled with students and their parents by talking face to face. Information on students’ daytime activity or eating habits was recorded according to their parents’ views. The study was conducted in accordance with the Helsinki Declaration principles. Institutional ethical committee approval was obtained. Verbal approval was obtained from the students and their parents before questionnaire forms were applied.

Statistical Analysis

SPSS (Statistical Package for Social Sciences) for Windows 20.0 program was used for statistical analysis during the evaluation of findings obtained by the study. Besides descriptive statistical methods (mean, median, standard deviation) while evaluating study data, student t test was used for comparison of parameters with normal distribution and Mann-Whitney U test was used for comparison of parameters without normal distribution. Pearson's correlation was used to investigate the correlations between variables. Statistical significance was defined as a level of 5% ($p < 0.05$).

Table 1. Percentage of BMI by sex

<table>
<thead>
<tr>
<th>BMI (%)</th>
<th>Girl</th>
<th>Boy</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;5</td>
<td>4 (4.65%)</td>
<td>3 (3.19%)</td>
</tr>
<tr>
<td>5-84</td>
<td>62 (72.09%)</td>
<td>62 (65.95%)</td>
</tr>
<tr>
<td>85-94</td>
<td>11 (12.79%)</td>
<td>16 (17.02%)</td>
</tr>
<tr>
<td>≥95</td>
<td>9 (10.4%)</td>
<td>13 (13.8%)</td>
</tr>
<tr>
<td>Total</td>
<td>86 (100%)</td>
<td>94 (100%)</td>
</tr>
</tbody>
</table>

Data are shown as number (%). BMI = body mass index
Results

Having analyzed BMI values using reference table of the World Health Organization, obesity was found in 12.2% and overweight was found in 15% of all students participating in the study. The proportion of obese girl students was 10.4% and obese boy students was 13.8%. Prevalence of overweight was 12.79% in girls and 17.02% in boys. The prevalence of obesity and overweight in boy students was significantly higher than that of girl students (Table 1).

Of the 180 children included in the study, 47.7% (n = 86) were girls and 52.3% (n = 94) were boys. Students were in the age range of 6-11 and the average age was 10.82 ± 2.49. Fifty-six point one percent of the fathers were graduate of primary school, 22% were graduate of high school and 21.9% were university graduates. Seventy-three point three percent of the fathers were graduate of primary school, 15% were graduate of high school and 11.7% were university graduates. Students had 2.01 brothers or sisters at average, total 4.9 people were living at home,

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Normal or thin children</th>
<th>Obese or overweight children</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Boy</td>
<td>65 (49.6%)</td>
<td>32 (65.3%)</td>
</tr>
<tr>
<td></td>
<td>Girl</td>
<td>66 (50.4%)</td>
<td>17 (34.7%)</td>
</tr>
<tr>
<td>Educational status of mother</td>
<td>Primary-secondary</td>
<td>95 (72.5%)</td>
<td>37 (75.5%)</td>
</tr>
<tr>
<td></td>
<td>High school-university</td>
<td>36 (27.5%)</td>
<td>12 (24.5%)</td>
</tr>
<tr>
<td>Educational status of father</td>
<td>Primary-secondary</td>
<td>71 (54.2%)</td>
<td>30 (61.2%)</td>
</tr>
<tr>
<td></td>
<td>High school-university</td>
<td>60 (45.8%)</td>
<td>19 (38.8%)</td>
</tr>
<tr>
<td>Time spent for watching tv</td>
<td>More than 2 hours a day</td>
<td>54 (41.2%)</td>
<td>32 (65.3%)</td>
</tr>
<tr>
<td></td>
<td>Less than 2 hours a day</td>
<td>77 (58.8%)</td>
<td>17 (34.7%)</td>
</tr>
<tr>
<td>Consumption of convenience food</td>
<td>Twice or more in a week</td>
<td>43 (32.8%)</td>
<td>36 (73.4%)</td>
</tr>
<tr>
<td></td>
<td>Less than twice in a week</td>
<td>88 (67.2%)</td>
<td>13 (26.6%)</td>
</tr>
<tr>
<td>Start of supplementary food</td>
<td>After 6 months</td>
<td>62 (47.3%)</td>
<td>26 (53.1%)</td>
</tr>
<tr>
<td>How many days does s/he exercise regularly</td>
<td>Before 6 months</td>
<td>69 (52.7%)</td>
<td>23 (46.9%)</td>
</tr>
<tr>
<td></td>
<td>2 days or more</td>
<td>89 (67.3%)</td>
<td>13 (26.6%)</td>
</tr>
<tr>
<td></td>
<td>Less than 2 days</td>
<td>42 (32.7%)</td>
<td>36 (73.4%)</td>
</tr>
</tbody>
</table>

Data are shown as number (%).

Table 2. Sociodemographic characteristics of obese or overweight children and normal or thin children

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Normal or thin children</th>
<th>Obese or overweight children</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mother BMI (kg/m²)</td>
<td>28.36 ± 4.29</td>
<td>28.02 ± 5.11</td>
<td>3.57</td>
</tr>
<tr>
<td>Father BMI (kg/m²)</td>
<td>26.94 ± 4.24</td>
<td>25.89 ± 3.39</td>
<td>2.66</td>
</tr>
</tbody>
</table>

Data are shown as mean±standard deviation. BMI = body mass index
watching television for 2.2 hours at average; 72% of which had breastfed more than 18 months and 78% started supplementary food after the 6th month.

The relation of sociodemographic and socioeconomic variables with obesity and overweight was investigated. There was no relationship between parents’ educational level and obesity and overweight. ($p > 0.05$) The percentage of obese or overweight children who spent more than 2 hours per day on television was 65.3%, while this rate was 34.7% in those with normal or less weight. Significant relationship was found between TV watching time and obesity. ($p < 0.05$) (Table 2).

While there was no significant difference between obese and overweight persons and non-obese persons in terms of delivery weight and time to start supplementary food, obesity was more prevalent among the ones who consume more convenience food ($p < 0.05$).

BMI of both mothers and fathers of the overweight and obese students were significantly higher than parents of the students with normal weight (Table 3).

**Discussion**

Retrospective studies have shown that adult obesity started in childhood or adolescence in proportion of 1/3. Obesity problem in children should be emphasized. Studies indicated that problem will become serious in the near future if necessary measurements are not taken [15].

Childhood obesity has been increasing at an alarming rate for the last ten years. WHO estimates that 42 million children under the age of 5 are currently obese [16]. Although there is information that obesity is the problem of developed countries until today, there has been an increase in developing countries in recent years [17]. In our country, “Turkey Healthy Nutrition and Active Life Program” which was prepared with the participation of Ministry of Health and various stakeholders and published in 2010 and put into practise in various factors is a program to prevent obesity in Turkey [18]. In comparison with other studies conducted in Turkey, we found a higher prevalence of obesity in our study. For example, in a study conducted in Muğla, of the total 4260 (2040 girls, 2220 boys) of 6-15 year old, 7.6% of the girls and 9.1% of the boys were found to be obese or overweight [19]. In our study, we found the prevalence of excess weight in the primary school students to be 15% and the obesity rate to be 12.2%. This situation can be explained by the fact that parents of the children included in the study have more weights than the normal population and the obesity frequency increases day by day. We found that overweight and obesity rates were 37.3% and 23.8%, respectively. In the overall health research carried out in Turkey in 2014, overweight rate was found to be 33.7% and obesity rate was 19.9% [20]. Parental obesity is seen as one of the most important risk factors for childhood obesity. Children whose parents are obese are 2.5 times more likely to be obese than those who are thinner [21].

In order to prevent obesity, it is important that children do not spend more than 2 hours per day in front of television and computer in the direction of recommendation stated in the study by Metinoğlu et al. [22] and by the American Academy [23-25]. It is stated in the studies that obesity risk increases in the children who watch TV for a long time [23-25]. It is associated with being completely passive-inactive, watching food-related advertisements and increase of energy intake accordingly while watching television [26-29]. In this study, the duration of television watching in the obese group was longer than the control group and was identified as a risk factor increasing the obesity, in accordance with the literature.

In a study carried out in Mexico, it was found that every one hour of moderate physical activity per day reduced the risk of obesity in children by 10% [30]. Increasing rates of obesity in children with low activity are also shown in various studies [31, 32]. We also found in our study that obesity prevalence in children who regularly exercise for at least 2 days a week was significantly less than those who do not exercise ($p <0.05$).

Eating fastly and chewing less thereby are indicated as another factor facilitating the development of obesity [33]. Fast-food style eating habits is the most important factor. In our study, obesity prevalence was significantly higher in the children of families who responded to the question ‘does your child prefer fast food?’ as at least twice a week and more.
The Limitations of the Study

There are some limitations in our study. Firstly, since there is usually only one parent with children who are admitted to polyclinics, the measurement of height and weight of the other parent could not be made and their statement was accepted. Moreover, parents who have been informed about the study beforehand might have responded to the questions unfairly.

Conclusions

In the light of these results, it can be indicated that primary school children whose parents have obesity, who have less physical activity and serious fast-food eating habits face the risk of obesity. In the fight against obesity, which has become an important issue of the preventive medicine in particular, it is important that lifestyle changes are adopted as the main subject of primary protection before diseases come out and since from the childhood.

It is also a positive step to address obesity as a priority issue and to take measurements for preventing childhood obesity in particular in order to prevent adult obesity and many chronic diseases within the scope of the national health policy.

Authorship declaration

All authors listed meet the authorship criteria according to the latest guidelines of the International Committee of Medical Journal Editors, and all authors are in agreement with the manuscript.

Conflict of interest

The authors disclosed no conflict of interest during the preparation or publication of this manuscript.

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[25] The Parliamentary Office of Science and Technology, Childhood...